

of fluid for an extended time period so that said transient characteristic may be accurately measured.

15. A system of the type described in claim 12 together with a plurality of storage means, and means for programming communication of said predetermined volume of fluid with separate ones of said plurality of storage means, whereby said transient characteristics are preserved in said predetermined volume of fluid.

16. In a fluid flow measuring system having a flow sampler actuated by a power source and responsive to an input signal including

- a flow meter for providing the input signal,
- means connected to the power source for providing positive and negative pressure,
- a sample chamber for measuring a predetermined fluid sample volume in communication with said means for providing positive and negative pressure,
- a fill sensor for sensing when said sample chamber is filled to a level at least as great as said predetermined sample volume, said fill sensor being located externally of said sample chamber, whereby fouling of said fill sensor by caustic samples or foreign matter therein is prevented,
- said fill sensor operating to terminate negative pressure in said sample chamber and to initiate positive pressure therein, thereby expelling fluid through said means for communicating so that the fluid volume in said sample chamber is reduced to said predetermined sample volume,
- means for communicating the fluid flow with said sample chamber,
- means for storing said predetermined sample volume,
- means for transferring said predetermined sample volume from said sample chamber to said means for storing, and timing means for providing a sampling sequence cycle, said timing means connected to said means for providing pressure, said sample chamber, and said means for transferring, whereby said positive and negative pressure is alternately communicated with said sample chamber to purge, fill and measure a sample therein, and to transfer the sample to said means for storing.

17. A fluid flow measuring system as in claim 16 wherein said means for storing includes a plurality of containers and said means for transferring communicates with said plurality of containers in sequence, and wherein said timing means includes reset means on completion of a sampling cycle, means for selecting a predetermined number of sampling cycles for each input signal, and means for selecting a predetermined number of samples for transfer to each container.

18. A fluid flow measuring system as in claim 17 together with counting means for recording the number of containers to which samples are transferred, said counting means producing an output signal after a predetermined count, said output signal being connected to said timing means for inhibiting said sampling cycle.

19. A fluid flow measuring system as in claim 16 wherein said flow meter includes a fluid head sensor, servo means driven by said head sensor, and a mechanical head to flow converter driven by said servo means, said flow meter including an electrical adjustment to said servo means for providing head to flow conversion for channels of a given cross section shape and having various shape sizes.

20. A fluid flow measuring system having a flow sampler actuated by a power source and responsive to an

input signal comprising a mechanical head to flow converter including a plurality of cams and cam followers for converting head in flow channels of a plurality of predetermined cross section shapes to flow therein, and means for selecting one of said cams to engage one cam follower, servo means driven by said fluid head sensor, a mechanical head to flow converter driven by said servo means,

- means connected to the power source for providing positive and negative pressure,
- means for measuring a predetermined fluid sample volume, in communication with said means for providing pressure,
- means for communicating the fluid flow with said means for measuring,
- means for storing said predetermined sample volume,
- means for transferring said predetermined sample volume from said means for measuring to said means for storing, and timing means for providing a sampling sequence cycle, said timing means connected to said means for providing pressure, said means for measuring, and said means for transferring, whereby said positive and negative pressure is alternately communicated with said means for measuring to purge, fill, and measure a sample therein, and to transfer the sample to said means for storing.

21. A fluid flow measuring system comprising a flow sampler responsive to an input signal comprising a framework, compressor means for providing positive and negative pressures at separate pressure ports thereon, a sample chamber mounted on said framework and having upper and lower limits for defining a total volume to be contained therein, means communicating between said sample chamber and the fluid flow, said means communicating including means having a lower portion fixed in position relative to said sample chamber lower limit for depositing the sample influx as close to said lower limit as possible while allowing the suspended solids in said sample to pass, said means fixed in position having an aperture above said lower portion, a pressure control valve in communication with said pressure ports for directing positive and negative pressures alternately to said sample chamber, sample storage means communicating with said sample chamber for receiving samples from said sample chamber, and means for transferring samples from said sample chamber to said sample storage means, a sample control valve disposed in said means for transferring for controlling transfer of fluid samples, a first timer producing a first output signal sequence connected to said pressure control valve, said first output signal sequence operating to actuate said pressure control valve to direct positive pressure and negative pressure to said sample chamber for predetermined periods of time, whereby said chamber is purged and filled through said means communicating between said chamber and the fluid flow, a fill sensor mounted externally on said chamber producing an output signal when said chamber is filled to a level above said aperture, said fill sensor output signal being connected to said pressure control valve for stopping chamber filling prior to the end of said first output sequence, a second timer producing a second output signal sequence connected to said pressure control valve and said sample control valve, said second output signal sequence operating to actuate said pressure control valve to direct positive pressure to said sample chamber to purge the fluid sample